AF/1763
IFW

PATENT APPLICATION
Do. No. 9898-207
Client No. SS-15432-US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Sang-Bom Kang, et al.		
Serial No.	10/052,703	Examiner:	Zervigon, Rudy
Confirmation No.	1366		
Filed:	January 16, 2002	Art Unit:	1763
For:	SEMICONDUCTOR DEPOSITION APPARATUS AND SHOWER HEAD		

TRANSMITTAL LETTER

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Enclosed for filing in the above-referenced application are the following:

☒ Appellant's Brief under 37 CFR § 1.192 (in triplicate).
☒ PTO Form 2038 authorizing credit card payment of $330.00 filing fee for brief in support of appeal is enclosed.
☒ Any deficiency or overpayment should be charged or credited to deposit account number 13-1703.

Customer No. 20575

Respectfully submitted,

MARGER JOHNSON & McCOLLOM, P.C.

Todd J. Iverson
Reg. No. 53,057

MARGER JOHNSON & McCOLLOM, P.C.
1030 SW Morrison Street
Portland, OR 97205
503-222-3613

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop Appeal Brief – Patents Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450
Date: September 1, 2004

Li Mei Vermilya

OIPE JC61
SEP 07 2004
PATENT & TRADEMARK OFFICE

PATENT APPLICATION
Do. No. 9898-207
Client No. SS-15432-US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Sang-Bom Kang, et al.		
Serial No.	10/052,703	Examiner:	Zervigon, Rudy
Confirmation No.	1366		
Filed:	January 16, 2002	Art Unit:	1763
For:	SEMICONDUCTOR DEPOSITION APPARATUS AND SHOWER HEAD		

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPELLANT'S BRIEF UNDER 37 CFR § 1.192

This Appeal Brief is in furtherance of the Notice of Appeal filed on 2 July 2004. Appeal is taken from the Office Action mailed on 2 March 2004, which finally rejected claims 1-37.

The fees required under §1.17(c) and any required petition for extension of time for filing this Brief and fees therefore are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This Brief is transmitted in triplicate.

This Brief contains these items under the following headings, and in the order set forth below.

09/08/2004 MBLANCO 00000035 10052703
01 FC:1402 330.00 OP

TABLE OF CONTENTS

I. REAL PARTY IN INTEREST

37 CFR §1.192(c) (1)

The present application has been assigned to the following party:

Samsung Electronics Co., Ltd.
416 Maetan-Dong, Paldal-Ku
Suwon-City, Kyunkgi-Do
Republic of Korea.

II. RELATED APPEALS AND INTERFERENCES

37 CFR §1.192(c) (2)

The Board's decision in the present Appeal will not directly affect, or be directly affected, or have any bearing on any other appeals or interferences known to Appellant, or to the Appellant's legal representative.

III. STATUS OF CLAIMS

37 CFR §1.192(c) (3)

1. Claims presented: 1-37
2. Claims withdrawn from consideration but not cancelled: 38-40
3. Claims canceled: NONE
4. Claims pending: 1-37 of which:
   a. claims allowed: NONE

b. claims rejected: 1-37

All the rejected claims, namely claims 1-37, are being appealed. The appealed claims are eligible for appeal, having been finally rejected.

IV. STATUS OF AMENDMENTS
37 CFR §1.192(c) (4)

Subsequent to the last Office Action mailed on 2 March 2004, which contained a final rejection of the appealed claims, no amendment has been filed.

V. SUMMARY OF THE INVENTION
37 CFR §1.192(c) (5)

According to some embodiments of the invention, a shower head evenly distributes a reaction gas to a wafer in a process chamber. The shower head includes a plurality of plates having gas paths configured therein to supply the reaction gas to the wafer. The shower head also includes a cooling system. The cooling system includes a plurality of coolant inlets and a plurality of coolant outlets formed in a lower one of the plurality of plates, and a plurality of inner cooling lines configured to connect each of the plurality of coolant inlets to one of the plurality of coolant outlets.

In addition, an apparatus according to other embodiments of the invention is capable of keeping the shower head cool while reducing the distance between the shower head and a high temperature heater to reduce inner volume of a process chamber and thereby reduce purging and pumping time, and the time required for forming the thin film. The apparatus includes a process chamber. A heater stage is installed in a lower portion of the process chamber to support a wafer and heat the wafer to a high temperature. A shower head is installed above the heater stage to supply a reaction gas to the wafer. A separating device is introduced between the bottom of the process chamber and the heater stage, in a space separating the heater stage from a process chamber, to reduce a volume of actual processing space.

VI. ISSUES ON APPEAL
37 CFR §1.192(c) (6)

A. Whether claims 1-9, 12, 14, 15 and 19 are anticipated under 35 U.S.C. § 102(b) by

U.S. Patent No. 4,534,816 to Chen et al. ("Chen").

B. Whether claims 10, 11, 13, 16-18, and 20-37 are unpatentable under 35 U.S.C. § 103(a) by Chen in view of U.S. Patent No. 6,120,605 to Sato ("Sato").

VII. GROUPING OF CLAIMS
37 CFR §1.192(c) (7)

The appealed claims 1-37 include three groups of claims.

The first group of claims consists of claims 1-8. Claims 2-8 depend from independent claim 1. The claims in the first group do not stand or fall together, since each of claims 3-8 are considered to be separately patentable from claim 1.

The second group of claims consists of claims 9-19. Claims 10-19 depend from independent claim 9. The claims in the second group do not stand or fall together, since claims 11 and 16 are considered to be separately patentable from claim 9.

The third group of claims consists of claims 20-37. Claims 21-37 depend from independent claim 20. The claims in the third group do not stand or fall together, since each of claims 22-27 and 34 are considered to be separately patentable from claim 20.

VIII. ARGUMENT
37 CFR §1.192(c) (8)

A. 35 U.S.C. § 102(b) rejections as applied to the first and second claim groups

1. *Claim 1 is not anticipated by Chen*

Claim 1 recites a shower head comprising, *inter alia*, ***a plurality of plates*** and a cooling system formed in a lower one of the plurality of plates. Claim 1 additionally recites that the cooling system comprises ***a plurality of coolant inlets, a plurality of coolant outlets,*** and ***a plurality of inner cooling lines*** configured to connect each of the plurality of coolant inlets to one of the plurality of coolant outlets (emphasis added).

It is alleged that Chen's electrode 12 is the recited lower one of the plurality of plates. Thus, in order to anticipate claim 1, Chen's electrode must have a plurality of coolant inlets,

a plurality of coolant outlets, and a plurality of inner cooling lines connecting the coolant inlets and the coolant outlets in the manner recited in claim 1. Chen's electrode 12 fails to do this, for the following reason.

It is alleged that the "channel between 56 and 62; Figure 5" is the recited plurality of inner cooling lines. The appellants disagree.

Chen FIG. 5 is a top cross-sectional view of electrode 12 showing the structure of a ***cooling passageway 56*** (column 5, lines 3-4; emphasis added). Please note that Chen refers to 56 as a singular ***passageway***, not as multiple passageways. With reference to FIGs. 5 and 6, Chen explicitly states that the passageway 56 is "fabricated by forming a plurality of parallel, spaced apart holes 58 extending horizontally through the electrode 12" (column 5, lines 5-8). A peripheral groove 60 is formed into electrode 12 coinciding with the holes 58, and a portion of the region between successive holes 58 is removed at the innermost surface of groove 60 (column 5, lines 8-11). Alternate ***open regions 62*** are thus formed at the surface of groove 60 as shown in FIG. 5 (column 5, lines 11-13; emphasis added).

The applicants believe that the following teaching of Chen has not been fully appreciated. Chen explicitly states that "[i]n the ***final assembly*** of electrode 12, a ring 64 (shown in FIG. 1) is fitted into groove 60 and ***welded to close the ends of alternate holes 58***" (FIGs. 5 and 6; column 5, lines 13-16; emphasis added). "With ring 64 inserted in groove 60, a ***single, continuous, serpentine passageway 56*** in electrode 12 [provides] for the flow of cooling fluid therethrough" (column 5, lines 20-22; emphasis added).

The point is that once final assembly is completed, Chen's electrode 12 has only a ***single*** passageway 56 for the flow of cooling fluid (emphasis added). This is directly contrary to the features of claim 1 highlighted above that require the cooling system formed in the lower one of the plurality of plates to have ***a plurality of inner cooling lines*** (emphasis added). Consequently, Chen fails to anticipate claim 1 because it does not show the identical invention in as complete detail as contained in the claim. MPEP 2131, citing Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236 (Fed. Cir. 1989).

Furthermore, as explained above, claim 1 requires that the alleged lower one of the plurality of plates (Chen's electrode 12) have a plurality of coolant inlets and a plurality of coolant outlets, where the plurality of inner cooling lines are configured to connect each of the coolant inlets to one of the coolant outlets. Chen's electrode 12 fails to do this, for the

following reason.

It is alleged that the recited coolant inlets are shown by "(56; Figure 5; column 5, lines 3-28)." To the contrary, the appellants have shown where Chen explicitly states that reference 56 is "a single, continuous, serpentine passageway 56 ... to provide for the flow of cooling fluid" (FIGs. 5 and 6; column 5, lines 20-22). It is alleged that the recited coolant outlets are shown by "(62; Figure 5; column 5, lines 3-28)." To the contrary, Chen teaches that the alleged coolant outlets 62 are actually open regions 62 formed at the surface of groove 60 (column 5, lines 8-13; FIG. 5). As explained above, Chen teaches that a ring 64 is fitted into the groove 60 and welded to close the ends of the holes 58 (FIGs. 5 and 6; column 5, lines 13-16). Thus, the open regions 62 formed at the surface of the groove 60 are also sealed by the ring 64. Any other interpretation would be contrary to Chen's explicit teaching of a "single, continuous, serpentine passageway 56."

Lest there be any doubt, Chen explicitly states that "the cooling ***fluid is transferred to and from passageway 56*** by ***a vertical inlet hole 66*** and ***a similar outlet hole 68*** which intersect the extreme ends of passageway 56 as shown in FIG. 2, and indicated by dashed lines in FIG. 5" (column 5, lines 23-27; emphasis added). Thus, it is clear that Chen's electrode 12 fails to teach the feature of a plurality of coolant inlets and a plurality of coolant outlets. Consequently, for this additional reason, Chen fails to anticipate claim 1 because it does not show the identical invention in as complete detail as contained in the claim. MPEP 2131, citing Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236 (Fed. Cir. 1989).

It was previously suggested in the office action dated 2 March 2004 that "Applicant is not addressing the specific claim limitations Applicant is arguing." To the contrary, the entire section presented above was presented in a previous response, and it was, both then and now, directed at explicitly recited features of claim 1, namely, that the alleged lower one of the plurality of plates (Chen's electrode 12) lacks the recited plurality of coolant inlets, the recited plurality of coolant outlets, and the recited plurality of inner cooling lines.

In the final office action, the appellants were asked to "[c]ompare the Examiner's citations of Chen's coolant inlets (56; FIG. 5) with Applicant's specific definition in the specification: Referring to FIG. 2, a primary cooling inlet 410a may supply a plurality of coolant inlets 411."

The appellants have done so. As explained above, Chen explicitly refutes the position

that (56, FIG. 5) is a plurality of coolant inlets. To restate Chen, "[w]ith ring 64 inserted in groove 60, a ***single, continuous, serpentine passageway 56*** in electrode 12 [provides] for the flow of cooling fluid therethrough" (column 5, lines 20-22; emphasis added). This is entirely incompatible with the features recited in claim 1. It is also incompatible with the appellant's alleged "specific definition" of a plurality of coolant inlets. See, for example, FIG. 2 of the specification, where there are four separate coolant inlets 411 for coolant entry into the lower plate 350. Thus, the position that (56, FIG. 5) is a plurality of coolant inlets cannot be reconciled with Chen's explicit teaching that passageway 56 is a "single, continuous, serpentine passageway" or with Chen's explicit teaching that "the cooling ***fluid is transferred to and from passageway 56*** by ***a vertical inlet hole 66*** and ***a similar outlet hole 68*** which intersect the extreme ends of passageway 56 as shown in FIG. 2, and indicated by dashed lines in FIG. 5" (column 5, lines 23-27; emphasis added).

In the final office action, the appellants were also asked to "[c]ompare the Examiner's citations of Chen's coolant outlets (62; FIG. 5) with Applicant's specific definition in the specification: The coolant travels through the inner cooling lines 450 in the third plate 350 to a plurality of coolant outlets 415."

The appellants have done so. As explained above, Chen explicitly refutes the position that (62, FIG. 5) is a plurality of coolant outlets. To restate Chen, "[w]ith ring 64 inserted in groove 60, a ***single, continuous, serpentine passageway 56*** in electrode 12 [provides] for the flow of cooling fluid therethrough" (column 5, lines 20-22; emphasis added). This is entirely incompatible with the features recited in claim 1. It is also incompatible with the appellant's alleged "specific definition" of a plurality of coolant outlets. See, for example, FIG. 2 of the specification, where there are four separate coolant outlets 415 for coolant exit from the lower plate 350. Thus, the position that (62, FIG. 5) is a plurality of coolant outlets cannot be reconciled with Chen's explicit teaching that passageway 56 is a "single, continuous, serpentine passageway" or with Chen's explicit teaching that "the cooling ***fluid is transferred to and from passageway 56*** by ***a vertical inlet hole 66*** and ***a similar outlet hole 68*** which intersect the extreme ends of passageway 56 as shown in FIG. 2, and indicated by dashed lines in FIG. 5" (column 5, lines 23-27; emphasis added).

If, as has been suggested, the recited "coolant inlets" and the recited "coolant outlets" may be defined as the point of entry and exit, respectively, of coolant into the lower plate,

then there has yet to be shown any portion of Chen that contradicts Chen's explicit teaching that "the cooling ***fluid is transferred to and from passageway 56*** by ***a vertical inlet hole 66*** and ***a similar outlet hole 68*** which intersect the extreme ends of passageway 56 as shown in FIG. 2, and indicated by dashed lines in FIG. 5" (column 5, lines 23-27; emphasis added).

2. *Claim 3 is not anticipated by Chen*

Claim 3 recites "at least four coolant inlets, at least four coolant outlets, and at least four inner cooling lines are formed." It is alleged that Chen also discloses "at least four coolant inlets (56; Figure 5; column 5, lines 3-28), at least four coolant outlets (62; Figure 5; column 5, lines 3-28), and at least four inner cooling lines (channel between 56 and 62; Figure 5)." The appellants disagree.

For the reasons explained above with respect to claim 1, Chen only teaches a single coolant inlet, a single coolant outlet, and a single inner cooling line. Thus, Chen also fails to teach or disclose that at least four coolant inlets, at least four coolant outlets, and at least four inner cooling lines are formed, as recited in dependent claim 3. Consequently, Chen fails to anticipate claim 3 because it does not show the identical invention in as complete detail as contained in the claim. MPEP 2131, citing Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236 (Fed. Cir. 1989).

3. *Claim 4 is not anticipated by Chen*

Claim 4 recites that "the plurality of coolant inlets are ***formed on a first side*** of the lower plate, the plurality of coolant outlets are ***formed on a second side*** of the lower plate, and the plurality of inner cooling lines are formed parallel to each other" (emphasis added). It is alleged that Chen element 56 (FIG. 5) discloses a plurality of coolant inlets, which are located on a first side of the lower plate. It is also alleged that element 62 (FIG. 5) discloses a plurality of coolant outlets, which are located on a second side of the lower plate. The appellants disagree.

It was explained above, with reference to claim 1, that elements 56 and 62 are a "single, continuous, serpentine passageway 56" and "open regions 62," respectively. Contrary to the features recited in claim 4, Chen explicitly states that "the cooling fluid is transferred to and from passageway 56 by ***a vertical inlet hole 66*** and ***a similar outlet hole 68***

which intersect the extreme ends of passageway 56 as shown in FIG. 2, and indicated by dashed lines in FIG. 5" (column 5, lines 23-27; emphasis added). It is apparent from a closer inspection of Chen FIG. 5 that the vertical inlet hole 66 and the similar outlet hole 68 are located on the ***same side*** of the electrode plate 12 (emphasis added).

Thus, contrary to claim 4, Chen teaches that the inlet holes and outlet holes are formed on the same side of the lower plate. Also contrary to claim 4, Chen does not teach that the plurality of inner cooling lines are formed parallel to teach other, because, as explained above, Chen does not teach a plurality of inner cooling lines. Consequently, Chen fails to anticipate claim 4 because it does not show the identical invention in as complete detail as contained in the claim. MPEP 2131, citing Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236 (Fed. Cir. 1989).

4. *Claim 5 is not anticipated by Chen*

Claim 5 recites "a first coolant inlet connected to a first coolant outlet by a first inner cooling line, wherein a second coolant outlet is connected to a second coolant inlet by a second inner cooling line, and wherein ***the second coolant outlet is located adjacent to the first coolant inlet on a first side of the lower plate"***(emphasis added). It is alleged Chen teaches that "the second coolant outlet (any other of 62; Figure 5; column 5, lines 3-28) is located adjacent to the first coolant inlet (any other of [56]; Figure 5; column 5, lines 3-28) on a first side of the lower plate." The appellants disagree.

It was explained above with reference to FIG. 1 that neither Chen's elements 62 nor Chen's element 56 are the recited coolant inlets or coolant outlets. To the contrary, it was shown that Chen teaches only a single vertical inlet hole 66 (column 5, lines 23-24). Likewise, it was shown that Chen teaches only a single similar outlet hole 68 (column 5, lines 24-25). Furthermore, it is apparent from a closer inspection of Chen FIG. 5 that the vertical inlet hole 66 and the vertical outlet hole 68 are not located adjacent to each other. Consequently, Chen fails to anticipate claim 5 because it does not show the identical invention in as complete detail as contained in the claim. MPEP 2131, citing Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236 (Fed. Cir. 1989).

5. *Claim 6 is not anticipated by Chen*

Claim 6 recites "a first coolant outlet is connected to a first coolant inlet by a first inner cooling line, and wherein the first coolant outlet is positioned approximately 90 degrees from a position of the first coolant inlet along an circumferential edge of the lower plate." It is asserted Chen teaches that "the first coolant outlet (any of 56; Figure 5; column 5, lines 3-28) is positioned approximately 90 degrees from a position of the first coolant inlet (any of 62; Figure 5; column 5, lines 3-28) along [a] circumferential edge of the lower plate." The appellants disagree.

It was shown above with reference to FIG. 1 that neither Chen's elements 62 nor Chen's element 56 are the recited coolant inlets or coolant outlets. To the contrary, it was shown that Chen teaches only a single vertical inlet hole 66 (column 5, lines 23-24). Likewise, it was shown that Chen teaches only a single similar outlet hole 68 (column 5, lines 24-25). Furthermore, it is apparent from a closer inspection of Chen FIG. 5 that the vertical inlet hole 66 and the outlet hole 68 are not positioned approximately 90 degrees apart along a circumferential edge of the lower plate. The vertical inlet hole 66 and the outlet hole 68 are not located on a circumferential edge of the lower plate at all. Consequently, Chen fails to anticipate claim 6 because it does not show the identical invention in as complete detail as contained in the claim. MPEP 2131, citing Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236 (Fed. Cir. 1989).

6. *Claim 7 is not anticipated by Chen*

Claim 7 recites "the second coolant outlet is located ***approximately 180 degrees*** from the first coolant inlet along the edge of the lower plate" (emphasis added). It is alleged Chen teaches that "the second coolant outlet (any other of 62; Figure 5; column 5, lines 3-28) is located approximately 180 degrees the first coolant inlet (any of 62; Figure 5; column 5, lines 3-28) on a first side of the lower plate." The appellants disagree.

It was explained above with reference to FIG. 1 that neither Chen's elements 62 nor Chen's element 56 are the recited coolant inlets or coolant outlets. Claim 7 recites first and second coolant inlets and first and second coolant outlets. To the contrary, it was shown that Chen teaches only a single vertical inlet hole 66 (column 5, lines 23-24). Likewise, it was shown that Chen teaches only a single similar outlet hole 68 (column 5, lines 24-25).

Furthermore, even if the vertical inlet hole 66 and the vertical outlet hole 68 could be

considered the recited first coolant inlet and the recited second coolant outlet, respectively, it is apparent from a closer inspection of Chen FIG. 5 that the vertical inlet hole 66 and the outlet hole 68 are not positioned approximately 180 degrees apart along the edge of the lower plate. Consequently, Chen fails to anticipate claim 7 because it does not show the identical invention in as complete detail as contained in the claim. MPEP 2131, citing Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236 (Fed. Cir. 1989).

7. *Claim 8 is not anticipated by Chen*

Claim 8 recites "a first outer cooling line arranged outside the lower plate to connect the plurality of coolant inlets; and a second outer cooling line arranged outside the lower plate to connect the plurality of coolant outlets." It is alleged that Chen's vertical inlet hole 66 is the recited first outer cooling line and that Chen's outlet hole 68 is the recited second outer cooling line.

However, contrary to claim 8, the vertical inlet hole 66 and outlet hole 68 do not connect the plurality of coolant inlets and the plurality of coolant outlets, respectively. It was shown above that Chen does not teach a plurality of coolant inlets, a plurality of coolant outlets, or a plurality of inner cooling lines. Chen explicitly teaches that "the cooling fluid is transferred ***to and from passageway 56*** by ***a vertical inlet hole 66*** and ***a similar outlet hole 68*** which intersect the ***extreme ends of passageway 56*** as shown in FIG. 2, and indicated by dashed lines in FIG. 5" (column 5, lines 23-27; emphasis added). To paraphrase, cooling fluid is transferred to and from ***one*** passageway 56 by ***one*** inlet hole 66 and ***one*** outlet hole 68 (emphasis added).

Furthermore, claim 8 requires that the recited first and second outer cooling lines be arranged outside the lower plate. To the contrary, referring to FIG. 4, Chen shows that the alleged first and second outer cooling lines 66, 68 are located *inside* the alleged lower plate 12.

Thus, Chen fails to teach or disclose a first outer cooling line arranged outside the lower plate to connect the plurality of coolant inlets; and a second outer cooling line arranged outside the lower plate to connect the plurality of coolant outlets. Consequently, Chen fails to anticipate claim 8 because it does not show the identical invention in as complete detail as contained in the claim. MPEP 2131, citing Richardson v. Suzuki Motor Co., 868 F.2d 1226,

1236 (Fed. Cir. 1989).

8. *Claim 9 is not anticipated by Chen*

Claim 9 recites an apparatus comprising, *inter alia*, a process chamber and a heater stage ***located in a lower portion of the process chamber*** (emphasis added).

It is alleged that the recited process chamber is disclosed by Chen's outer housing 30 (FIG. 1; column 3, line 40). It is alleged that the recited heater stage is disclosed by Chen's upper section 40 (FIG. 1; column 3, line 51). Chen also refers to upper section 40 as an electrode 40 (FIG. 1; column 3, line 57).

However, claim 9 also requires that the alleged heater stage 40 be located ***in*** a lower portion of the alleged process chamber 30 (emphasis added). If one accepts that Chen's upper section 40 is the recited heater stage and that Chen's outer housing 30 is the recited process chamber, then FIG. 1 clearly shows that the top (uppermost surface) of the alleged heater stage 40 does not reach the level of the bottom (lowest surface) of the alleged process chamber 30. In other words, Chen FIG. 1 shows the alleged heater stage 40 positioned ***below***, not ***in***, the alleged process chamber 30 (emphasis added). Thus, it is impossible for the alleged heater stage 40 to be located ***in*** a lower portion of the alleged process chamber 30, because the uppermost surface of the alleged heater stage 40 is not located in the space defined by the alleged process chamber 30 (emphasis added).

The words of pending claims must also be interpreted consistently with the specification. MPEP 2111. The argument that Chen FIG. 1 shows an alleged heater stage 40 located in a lower portion of an alleged process chamber 30 is inconsistent with the specification at FIG. 1, where the heater stage 600 is illustrated as being located in the process chamber 200. The appellants note that using the specification in this manner to interpret words that are explicitly recited in the claims is perfectly valid, and is not the same thing as impermissibly reading limitations of the specification into the claim that have no express basis in the claim. See, e.g., MPEP 2111, *citing* In re Prater, 415 F.2d 1393, 1404-05 (CCPA 1969).

For the above reasons, Chen does not anticipate claim 9 because it does not show the identical invention in as complete detail as contained in the claim. MPEP 2131, citing Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236 (Fed. Cir. 1989).

Claim 9 also recites a separating device arranged between a bottom of the process chamber and a bottom of the heater stage, said separating device ***configured to separate the heater stage from the bottom of the process chamber*** and ***to reduce a volume of processing space within the process chamber*** (emphasis added).

It is alleged that the recited separating device is disclosed by Chen's insulating ring 44 (FIG. 1; column 3, line 60). It is further alleged that Chen's insulating ring 44 is arranged (positioned) between a bottom (lowest surface) of the alleged process chamber 30 and a bottom (lowest surface) of the alleged heater stage 40.

However, contrary to claim 9, the alleged separating device 44 is not configured to separate the alleged heater stage 40 from the bottom of the alleged process chamber 30. This can be seen in Chen FIG. 1, where an exhaust ring 28 is in direct contact with the bottom of the alleged process chamber 30 and an upper surface of the alleged heater stage 40 (column 4, lines 9-15). Thus, it is the exhaust ring 28, and not the alleged heater stage 40, that is configured to separate the heater stage from the bottom of the alleged process chamber 30.

Also contrary to claim 9, the alleged separating device 44 is not configured to reduce a volume of processing space within the alleged processing chamber 30. This is because, like the alleged heater stage 40, the alleged separating device 44 is not located ***within*** the alleged processing chamber 30 (emphasis added).

Furthermore, it has been suggested with respect to the above features of claim 9 (separating device ***configured to separate*** the heater stage from the bottom of the process chamber ***and to reduce a*** volume of processing space within the process chamber, emphasis added), that claiming an apparatus "for forming a thin film" is merely a statement of intended use of the apparatus. While the feature "for forming a thin film" that is found in the preamble to claim 9 may very well be a statement of intended use, the other claim 9 feature of "configured to separate ... and to reduce a volume" are not statements of intended use, but actual structural features of the claim, as emphasized by the use of the word "configured." Thus, if Chen is not "configured to separate ... and to reduce a volume" as recited in claim 9 (which appellants have shown in the discussion above to be true), then Chen does not meet all the structural features recited in claim 9.

Consequently, for these additional reasons, Chen does not anticipate claim 9 because it does not show the identical invention in as complete detail as contained in the claim.

MPEP 2131, citing Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236 (Fed. Cir. 1989).

B. 35 U.S.C. §103(a) rejections as applied to the second and third claim groups

1. Claim 11 is not obvious in view of the Chen/Sato combination

Claim 11 recites that the separating device is located in a lower portion of the process chamber and contacts the bottom of the heater stage. It is alleged that Sato teaches a heater stage (17; FIG. 1; column 4, lines 44-65). It is also alleged that Sato teaches a separating device (lowest portion of 11; Figure 1) that contacts a bottom of Sato's heater stage 17. The appellants disagree.

Sato teaches that the alleged separating device (lowest portion of 11) is actually a side wall 11 of a reactor 10 (FIG. 1; column 4, lines 46-47). The reactor 10 also includes a top wall 12 (FIG. 1; column 4, lines 46-47). Thus, Sato's reactor 10 corresponds to the recited process chamber of claim 9, upon which claim 11 depends.

According to claim 9, the separating device must be arranged between a bottom of the process chamber and a bottom of the heater stage. Sato's sidewall 11 does not fulfill this requirement because it is apparent from FIG. 1 that the sidewall 11 forms the bottom of the process chamber.

Furthermore, claim 9 requires that the separating device be configured to separate the heater stage from the bottom of the process chamber. Sato's sidewall 11 does not fulfill this requirement because it is apparent from FIG. 1 that the sidewall 11 forms the bottom of the process chamber.

Claim 11 requires that the separating device contact the bottom of the heater stage. Although it is true that Sato's sidewall 11 contacts the bottom of Sato's heater 17, as explained above, Sato's sidewall 11 cannot be the recited separating device because it fails the other criteria for the separating device that is found in claim 9. In other words, Sato's sidewall 11 may be the bottom of the recited process chamber, but it is not the recited separating device.

Thus, Sato does not teach or suggest a separating device that contacts the bottom of the heater stage, because Sato's sidewall 11 is not a separating device as defined in claim 9. Furthermore, Chen's alleged separating device 44 does not contact the bottom of the alleged heater stage 40. Consequently, the Chen/Sato combination fails to establish *prima facie* obviousness for claim 11 because the combination fails to teach or suggest all the features of

the claim. MPEP 2143.03.

2. Claim 16 is not obvious in view of the Chen/Sato combination

Claim 16 recites that the separating device is rim-shaped and is configured to closely adhere to the bottom of the heater stage. It is alleged that Sato's sidewall 11 teaches this feature. The appellants disagree.

As was explained above with respect to claim 11, Sato does not teach this feature because Sato's alleged separating device (sidewall 11) fails the other criteria for a separating device that are found in claim 9, upon which claim 16 depends. Furthermore, Chen's alleged separating device 44 is not configured to closely adhere to the bottom of the alleged heater stage 40. Consequently, the Chen/Sato combination fails to establish *prima facie* obviousness for claim 16 because the combination fails to teach or suggest all the features of the claim. MPEP 2143.03.

3. Claim 20 is not obvious in view of the Chen/Sato combination

Claim 20 recites, *inter alia*, a shower head cooling system arranged in a lower plate that includes a plurality of coolant inlets, a plurality of coolant outlets, and a plurality of independent inner cooling lines for connecting each of the coolant inlets to one of the coolant outlets. These features are substantially similar to the features recited in claim 1, except that the additional word "independent" is associated with the recited plurality of inner cooling lines.

Thus, Chen fails to teach or suggest the above features of claim 20 for all of the same reasons that were explained above with respect to claim 1. In addition to those reasons, the additional impact of the claim term "independent" must be considered in judging the patentability of the claim. MPEP 2143.03, *citing* In re Wilson, 424 F.2d 1382, 1385 (CCPA 1970).

The words of pending claims must also be interpreted consistently with the specification. MPEP 2111. FIG. 2 of the specification illustrates a lower plate 350 having four coolant inlets 411, four coolant outlets 415, and having four inner cooling lines 450 that connect each of the four coolant inlets 411 to one of the coolant outlets 415. FIG. 2 illustrates that the fluid path of each of the four inner cooling lines 450 through the lower plate 350 is

independent of the other inner cooling lines 450.

Chen's passageway 56 is inconsistent with the above description of inner cooling lines. As explained above, Chen explicitly states that the flow of cooling fluid through the electrode 12 is provided by "a ***single, continuous, serpentine passageway 56***" (column 5, lines 20-22; emphasis added). Thus, Chen teaches only a single, continuous passageway 56, and this is inconsistent with the explicitly recited feature of a plurality of independent inner cooling lines within the recited lower plate.

Additionally, Sato fails to teach the above features of claim 20 that Chen fails to teach. Consequently, the Chen/Sato combination fails to establish *prima facie* obviousness for claim 20 because the combination fails to teach or suggest all the features of the claim. MPEP 2143.03.

4. Claim 22 is not obvious in view of the Chen/Sato combination

Similar to claim 3, claim 22 recites at least four coolant inlets, at least four coolant outlets, and at least four inner cooling lines. Thus, for the same reasons outlined for claim 3, Chen does not teach these features of claim 22. In addition, Sato is not alleged to teach the features of claim 22 that Chen fails to teach. Consequently, the Chen/Sato combination fails to establish *prima facie* obviousness for claim 22 because the combination fails to teach or suggest all the features of the claim. MPEP 2143.03.

5. Claim 23 is not obvious in view of the Chen/Sato combination

Similar to claim 4, claim 23 recites the plurality of coolant inlets are formed on one side of the lower plate, the plurality of coolant outlets are formed on an opposite side of the lower plate. Thus, for the same reasons outlined for claim 4, Chen does not teach these features of claim 23. In addition, Sato is not alleged to teach the features of claim 23 that Chen fails to teach. Consequently, the Chen/Sato combination fails to establish *prima facie* obviousness for claim 23 because the combination fails to teach or suggest all the features of the claim. MPEP 2143.03.

6. Claim 24 is not obvious in view of the Chen/Sato combination

Similar to claim 5, claim 24 recites the second coolant outlet is arranged adjacent to

the first coolant inlet on a first side of the lower plate. Thus, for the same reasons outlined for claim 5, Chen does not teach these features of claim 24. In addition, Sato is not alleged to teach features of claim 24 that Chen fails to teach. Consequently, the Chen/Sato combination fails to establish *prima facie* obviousness for claim 24 because the combination fails to teach or suggest all the features of the claim. MPEP 2143.03.

7. Claim 25 is not obvious in view of the Chen/Sato combination

Claim 25 recites a first coolant outlet connected to a first coolant inlet by a first inner cooling line, wherein ***the first inner cooling line has a path that forms an approximately 90 degree angle, said angle having a vertex located at approximately the center of the lower plate*** (emphasis added). Neither Chen nor Sato teach or suggest this feature, and there has not been any specific allegation made as to where Chen and/or Sato teach or suggest this feature. Consequently, the Chen/Sato combination fails to establish *prima facie* obviousness for claim 25 because the combination fails to teach or suggest all the features of the claim. MPEP 2143.03.

8. Claim 26 is not obvious in view of the Chen/Sato combination

Similar to claim 7, claim 26 recites the second outlet is located approximately 180 degrees from the first coolant inlet along the circumferential edge of the lower plate. Thus, for the same reasons outlined for claim 7, Chen does not teach these features of claim 26. In addition, Sato is not alleged to teach features of claim 26 that Chen fails to teach. Consequently, the Chen/Sato combination fails to establish *prima facie* obviousness for claim 26 because the combination fails to teach or suggest all the features of the claim. MPEP 2143.03.

9. Claim 27 is not obvious in view of the Chen/Sato combination

Similar to claim 8, claim 27 recites a first outer cooling line located outside the lower plate and configured to connect the plurality of coolant inlets, and a second outer cooling line located outside the lower plate and configured to connect the plurality of coolant outlets. Thus, for the same reasons outlined for claim 8, Chen does not teach these features of claim 27. In addition, Sato is not alleged to teach features of claim 27 that Chen fails to teach.

Consequently, the Chen/Sato combination fails to establish *prima facie* obviousness for claim 27 because the combination fails to teach or suggest all the features of the claim. MPEP 2143.03.

10. Claim 34 is not obvious in view of the Chen/Sato combination

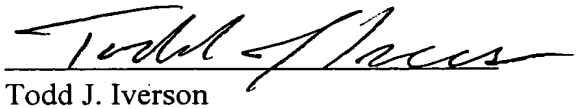
Similar to claim 16, claim 34 recites the separating device is rim shaped and is configured to closely adhere to a bottom of the heater stage. Thus, for the same reasons outlined for claim 16, Chen does not teach these features of claim 34. In addition, Sato is not alleged to teach features of claim 34 that Chen fails to teach. Consequently, the Chen/Sato combination fails to establish *prima facie* obviousness for claim 34 because the combination fails to teach or suggest all the features of the claim. MPEP 2143.03.

CONCLUSION

The Appellant requests favorable consideration by the Board. If any questions remain, please call the undersigned at (503) 222-3613.

Respectfully submitted,

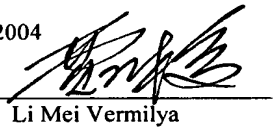
MARGER JOHNSON & McCOLLOM, P.C.



Todd J. Iverson
Reg. No. 53,057

MARGER JOHNSON & McCOLLOM, P.C.
1030 SW Morrison Street
Portland, OR 97205
503-222-3613

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop Appeal Brief – Patents Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450
Date: September 1, 2004



Li Mei Vermilya

APPENDIX

37 CFR §1.192(c) (9)

The text of the claims on appeal (1-37) is:

1. (Original) A shower head for supplying a reaction gas to a wafer in a process chamber, the shower head comprising:

a plurality of plates comprising gas paths for supplying a reaction gas to a wafer; and

a cooling system comprising a plurality of coolant inlets and a plurality of coolant outlets formed in a lower one of the plurality of plates, and further comprising a plurality of inner cooling lines configured to connect each of the plurality of coolant inlets to one of the plurality of coolant outlets.

2. (Original) A shower head according to claim 1, wherein the plurality of coolant inlets and the plurality of coolant outlets are formed on a side of the lower plate.

3. (Original) A shower head according to claim 1, wherein at least four coolant inlets, at least four coolant outlets, and at least four inner cooling lines are formed.

4. (Original) A shower head according to claim 1, wherein the plurality of coolant inlets are formed on a first side of the lower plate, the plurality of coolant outlets are formed on a second side of the lower plate, and the plurality of inner cooling lines are formed parallel to each other.

5. (Original) A shower head according to claim 1, wherein a first coolant inlet is connected to a first coolant outlet by a first inner cooling line, wherein a second coolant outlet is connected to a second coolant inlet by a second inner cooling line, and wherein the second coolant outlet is located adjacent to the first coolant inlet on a first side of the lower plate.

6. (Original) A shower head according to claim 1, wherein a first coolant outlet is connected to a first coolant inlet by a first inner cooling line, and wherein the first coolant outlet is positioned approximately 90 degrees from a position of the first coolant inlet along

an circumferential edge of the lower plate.

7. (Original) A shower head according to claim 6, wherein a second coolant inlet is located adjacent to the first coolant outlet, wherein the second coolant outlet is connected to a second coolant inlet by a second inner cooling line, and wherein the second coolant outlet is located approximately 90 degrees from a position of the second coolant inlet along the edge of the lower plate, and wherein the second coolant outlet is located approximately 180 degrees from the first coolant inlet along the edge of the lower plate.

8. (Original) A shower head according to claim 1, further comprising:

a first outer cooling line arranged outside the lower plate to connect the plurality of coolant inlets; and

a second outer cooling line arranged outside the lower plate to connect the plurality of coolant outlets.

9. (Previously Amended) An apparatus for forming a thin film, said apparatus comprising:

a process chamber;

a heater stage located in a lower portion of the process chamber, said heater stage configured to support a wafer and to heat the wafer to a high temperature;

a shower head located in an upper portion of the process chamber, said shower head configured to supply a reaction gas to the wafer; and

a separating device arranged between a bottom of the process chamber and a bottom of the heater stage, said separating device configured to separate the heater stage from the bottom of the process chamber and to reduce a volume of processing space within the process chamber.

10. (Original) An apparatus according to claim 9, wherein the high temperature is about 500 °C.

11. (Previously Amended) An apparatus according to claim 9, wherein the

separating device is located in a lower portion of the process chamber and contacts the bottom of the heater stage.

12. (Original) An apparatus according to claim 9, wherein the separating device is configured to separate the heater stage and the process chamber by a uniform distance.

13. (Original) An apparatus according to claim 12, wherein the heater stage and the process chamber are separated by about 2-10cm.

14. (Original) An apparatus according to claim 9, wherein the separating device is formed of a heat-resistant material.

15. (Original) An apparatus according to claim 14, wherein the heat-resistant material is a ceramic material.

16. (Original) An apparatus according to claim 9, wherein the separating device is rim-shaped and is configured to closely adhere to the bottom of the heater stage.

17. (Original) An apparatus according to claim 9, further comprising:

a shaft installed beneath the heater stage and configured to raise and lower the heater stage; and

a shaft introduction portion configured to introduce the shaft at the bottom of the process chamber.

18. (Original) An apparatus according to claim 17, wherein shaft introduction portion is formed as a flexible bellows and has a length that varies as the shaft is raised and lowered.

19. (Original) An apparatus according to claim 9, further comprising a process chamber cooling system configured to cool a bottom surface of the process chamber whereon the separating device is located.

20. (Original) An apparatus for forming a thin film, said apparatus comprising:

a process chamber;

a heater stage arranged in a lower portion of the process chamber and configured to support a wafer and to heat the wafer to a high temperature;

a shower head disposed in an upper portion of the process chamber and configured to supply a reaction gas to the wafer, said shower head comprising a plurality of plates having a plurality of gas paths formed therein and a shower head cooling system arranged in a lower plate;

said cooling system comprising a plurality of coolant inlets, a plurality of coolant outlets, and a plurality of independent inner cooling lines for connecting each of the coolant inlets to one of the coolant outlets; and

a separating device arranged between the process chamber and the heater stage to separate a space beneath the heater stage from a process chamber space containing the wafer to reduce a process volume of the process chamber.

21. (Original) An apparatus according to claim 20, wherein the plurality of coolant inlets and the plurality of coolant outlets are formed along an edge of the lower plate.

22. (Original) An apparatus according to claim 20, wherein at least four coolant inlets, at least four coolant outlets, and at least four inner cooling lines are formed.

23. (Original) An apparatus according to claim 20, wherein the plurality of coolant inlets are formed on one side of the lower plate, the plurality of coolant outlets are formed on an opposite side of the lower plate, and the plurality of inner cooling lines are formed parallel to each other.

24. (Original) An apparatus according to claim 20, wherein a first coolant outlet is connected to a first coolant inlet by a first inner cooling line, wherein a second coolant inlet is connected to a second coolant outlet by a second inner cooling line, wherein the second coolant outlet is arranged adjacent to the first coolant inlet on a first side of the lower plate,

wherein the first coolant outlet is located adjacent to the second coolant inlet on a second side of the lower plate, and wherein the second side of the lower plate is opposite the first side.

25. (Original) An apparatus according to claim 20, wherein a first coolant outlet is connected to a first coolant inlet by a first inner cooling line, wherein the first inner cooling line has a path that forms an approximately 90 degree angle, said angle having a vertex located at approximately the center of the lower plate.

26. (Original) An apparatus according to claim 25, wherein a second coolant inlet is located adjacent to the first coolant outlet, and wherein a second coolant outlet is connected to the second coolant inlet by a second inner cooling line, and wherein the second outlet is located approximately 90 degrees from the second coolant inlet along a circumferential edge of the lower plate, and wherein the second outlet is located approximately 180 degrees from the first coolant inlet along the circumferential edge of the lower plate.

27. (Original) An apparatus according to claim 20, further comprising:

a first outer cooling line located outside the lower plate and configured to connect the plurality of coolant inlets; and

a second outer cooling line located outside the lower plate and configured to connect the plurality of coolant outlets.

28. (Original) An apparatus according to claim 20, wherein the high temperature is about 500 °C.

29. (Original) An apparatus according to claim 20, wherein the separating device is arranged in proximity to a bottom of the heater stage in a lower portion of the process chamber.

30. (Original) An apparatus according to claim 20, wherein the heater stage and the process chamber are separated by a substantially uniform distance using the separating device.

31. (Original) An apparatus according to claim 30, wherein the heater stage and the process chamber are separated by about 2-10 cm.

32. (Original) An apparatus according to claim 20, wherein the separating device is formed of a heat-resistant material.

33. (Original) An apparatus according to claim 32, wherein the heat-resistant material is a ceramic material.

34. (Original) An apparatus according to claim 20, wherein the separating device is rim shaped and is configured to closely adhere to a bottom of the heater stage.

35. (Original) An apparatus according to claim 20, further comprising:

a shaft configured to raise and lower the heater stage, said shaft arranged beneath the heater stage; and

a shaft introduction portion configured to contain the shaft at the bottom of the process chamber.

36. (Original) An apparatus according to claim 35, wherein the shaft introduction portion comprises a flexible bellows wall having a variable length depending on the raising and lowering of the shaft.

37. (Original) An apparatus according to claim 20, further comprising a process chamber cooling system arranged in thermal communication with a lower portion of the process chamber, said lower portion of the process chamber supporting the separating device.